DIDACTIC REGULATIONS OF THE DEGREE PROGRAM

BIOLOGY

CLASS L-13

School: Polytechnic and Basic Sciences

Department: Biology

Regulations in force since the academic year 2025/26

ACRONYMS

CCD	[Commissione di Coordinamento Didattico]	Didactic Coordination Commission
CdS	[Corso/i di Studio]	Degree Program
CFU	[Crediti Formativi Universitari = 1 ECTS]	University training credits
CPDS	[Commissione Paritetica Docenti-Studenti]	Joint Teachers-Students Committee
OFA	[Obblighi Formativi Aggiuntivi]	Additional Training Obligations
SUA-CdS	[Scheda Unica Annuale del Corso di Studio]	Annual single form of the Degree Program
RDA	[Regolamento Didattico di Ateneo]	University Didactic Regulations

INDEX

Art. 1
Object

1. This Didactic Regulations govern the organisational aspects of the Degree Program in "Biology" (class L-13 – Biological Sciences). The Degree Program in Biology is hinged in the Department of Biology.

   General Information

   Degree Program name in Italian: Biologia
   Degree Program name in English: Biology
   Class: L-13 Biological Sciences
   Teaching language: Italian
   Course delivery methods: conventional
2. The Degree course is governed by the Didactic Coordination Commission (CCD), pursuant to Art. 4 of the RDA.
3. The Didactic Regulations is issued in compliance with the relevant legislation in force, the Statute of the University of Naples Federico II, and the RDA.

Art. 2
Training objectives

The three-year degree in Biology has as its specific educational objective the preparation of graduates who have acquired solid knowledge in the cultural fields of basic biology such as to allow both the continuation of their studies addressing specific aspects of Biology and access to the world of work in technical-executive roles. The three-year degree in Biology ensures cultural training for the continuation of studies in the master's degrees and, in particular, ensures possession of the curricular requirements for access to all the master's degrees of the LM-6 class of the Department of Biology of the University of Naples Federico II.

Therefore, graduates must:
- have basic knowledge in mathematical-statistical, chemical, physical and computer science disciplines, especially those parts that support biological topics have adequate knowledge in the various fields of modern biology, of biological problems and the ability to understand methodologies for biological investigation in both sectoral and multidisciplinary fields;
- be able to apply the scientific method in biological investigation be able to use experimental and data analysis methodologies independently;
- be able to work in an integrated way in a team and to work in the laboratory with appropriate safety behaviour be able to possess adequate skills and tools for communication and information management:
- be able to use modern cognitive tools for updates on acquired scientific subjects;
- be able to use effectively, in written and oral form, at least one language of the European Union, in addition to Italian, in the specific field of competence and for the exchange of general information.

The Degree Program is organised to enable the acquisition of the theoretical and operational fundamentals concerning:
- mathematical, chemical and physical skills, which are basic disciplines for all science degrees and particularly suited to fostering the development of a scientific mindset in the student;
- skills in the fields of botany, zoology, cytology, histology, developmental biology, ecology, biochemistry, molecular biology, genetics, physiology, microbiology, plant physiology.

These cultural areas will enable the acquisition of:
-general biology skills enabling the graduate to have a wide-ranging knowledge of the biological world, from microorganisms to the plant and animal world to man, with a look also at ecosystems;
- cell-molecular skills, since it is essential to complement the general biological background with in-depth knowledge of the molecular mechanisms underlying the functioning of living organisms;
- human biology skills, in order to reinforce the osmosis between the biological world, which studies life in its most varied manifestations, and other cultural fields more specifically addressed to the study of man.

The student will also acquire knowledge of the complex world of work in the biological sector, as well as appreciate for the first time the relationship between university preparation and professional activities by choosing to carry out:
a) an internship in a biological research laboratory, or an analytical or monitoring laboratory, or a production company in the biological, biochemical, pharmaceutical or biotechnological field, or a health facility, or a territorial body active in environmental or conservation practices, a park or nature reserve, or a facility engaged in voluntary work,

or alternatively

b) activities aimed at acquiring further knowledge useful for entering the world of work.
The Biology graduate will acquire at least one European Union language in addition to Italian and will possess adequate knowledge of the use of computer science tools, necessary in the specific field of competence and for the exchange of general information.
The time reserved for personal study or other individual training activities is more than 60% of the total hourly commitment for frontal teaching and laboratory activities.

Art. 3
Professional profile and work opportunities

PROFESSIONAL PROFILE: Junior biologist (passing the state examination for junior biologist, section B of the register, Presidential Decree no. 328/01)

Function in a work context:
The three-year Biology graduate can perform professional activities involving the use of standardised methodologies, such as performing in technical-executive roles of:
- analytical-instrumental procedures related to biological investigations, cytological, microbiological, metabolic, biochemical, molecular, genetic and biodiversity analyses;
- technical-analytical procedures in the chemical-physical, biological, biotechnological, biomolecular, biomedical fields also aimed at research and control activities in the environmental and food fields;
- quality control and support procedures in production and technological activities within companies and activities for the dissemination and scientific dissemination of the knowledge acquired;
- assessment of biotic impact on the conservation of cultural heritage;
- environmental monitoring (water, air, food);
- quality control procedures in all biological fields;
- medical-scientific and pharmaceutical information;
- training and scientific dissemination;

- creation and management of databases in the biological field.

Skills associated with the function:
To perform the functions described above, the specific knowledge, skills and abilities that the biologist will acquire in the three-year course are required:
- adequate basic knowledge of the various fields of biology;
- multidisciplinary methodological and technological knowledge for biological investigation;
- solid competences and technological skills in wide-ranging biological and instrumental analyses, aimed at research, monitoring and control activities;
- knowledge of at least one European Union language, in addition to Italian, in the specific field of competence;
- adequate communication and information management skills and tools;
- ability to work in a team, autonomously and to be able to fit into the work environment;
- basic cognitive tools for the continuous updating of one's knowledge.

Employment opportunities:
- universities and public and private research centres;
- public and private analysis laboratories in the bio-health, agri-food, environmental, biotechnological, food, drug research and industry sectors, etc., and in industries (e.g. pharmaceutical, food, agri-industrial);
- scientific communication, dissemination and information studies;
- cultural heritage protection institutions, parks, museums, botanical gardens, biological or biochemical monitoring and environmental impact agencies;
- multidisciplinary professional firms engaged in the fields of environmental impact assessment, project development for the conservation and restoration of the environment and biodiversity, and biosafety;
- structures involved in scientific publishing in the biological-naturalistic field and in translations in the biological field.

The occupational areas, the related training objectives, and the consequent structure of the Degree course have been harmonised at a national level within the framework of the CBUI coordination, through periodic meetings held with the participation of representatives of the Order of Biologists, the Biologists' Trade Unions, and representatives of national organisations and the world of production.

Art. 4
Admission requirements and knowledge required for access to the Degree Program[1]

The knowledge required for the Degree course in Biology includes the basic principles of the Mathematical, Physical and Natural Sciences, and in particular: 1) basic knowledge of biology including the general organisation of a prokaryote and eukaryote cell: the structure and function of nucleic acids; general concepts of autotrophism and heterotrophism, aerobiosis and anaerobiosis, photosynthesis; general concepts of classification of animal and plant organisms; general concepts of evolution of species; 2) basic knowledge of mathematics, including the fundamentals of algebraic and arithmetic calculus, analytical geometry, elementary functions; 3) basic knowledge of classical physics, with reference to the fundamentals of mechanics and optics; 4) basic knowledge of chemistry, with reference to the fundamentals of the structure and properties of matter and its states of aggregation, and the periodic properties of the elements;

[1] Artt. 7, 13, 14 of the University Didactic Regulations.

5) basic knowledge and use of the most widely used computer programmes; 6) elementary knowledge of the English language, with reference to the principles of translation and comprehension of simple written texts.

The following abilities are also required: - the ability to interpret the meaning of a text and to synthesise or re-elaborate it in written and oral form; - the ability to solve a problem by correctly identifying data and using them in the most effective form; - the ability to use elementary logical structures (e.g. the meaning of implication, equivalence, negation of a sentence, etc.) in written and oral discourse; - the ability to critically evaluate data or observations and use them appropriately in their context (e.g. to be able to grasp obvious inconsistency in a scientific measure); - the ability to use elementary logical structures (e.g. the meaning of implication, equivalence, negation of a sentence, etc.) in written and oral discourse; - the ability to critically evaluate data or observations and to use them appropriately in their context (e.g. to be able to detect an obvious inconsistency in a scientific measurement).

In order to verify possession of the knowledge required for admission, matriculating students will have to take an assessment test. This test will be aimed at providing general indications on the state of basic knowledge required. The criteria and procedures for the access test will be set out in detail in the competition notice, which will also indicate a minimum score that will guarantee access to the course without debts. Those who fall below the minimum threshold will be assigned an Additional Training Obligations (OFA) to be met in the first year of the course in accordance with the regulations in force.

Art. 5
Procedures for access to the Degree Program

1. The CCD of the Degree Program normally regulates the admission criteria and any scheduling of enrolments, except in the case subject to different provisions of law[2].
2. In the event of negative assessment of the adequate initial preparation regarding knowledge requirements for admission to the Degree Program, the CCD assigns specific OFA, indicating the means of verification to be fulfilled within the first year of the Program.
   Admission to the Degree course in Biology is by means of programmed numbering on a local basis, as it envisages the use of highly specialised laboratories, computer, and technological systems or, in any case, customised study places. Programmed access at national level is governed by Law 264 of 1999 and subsequent amendments and supplements.
   For each academic year, the CCD regulates the admission criteria and assigns specific OFA, indicating the verification procedures to be fulfilled within the first year of the course.
   The number of places available and the criteria and procedures for admission to the Degree course in Biology will be indicated in the call for applications for each academic year.

[2] National programmed access is regulated by L. 264/1999 and subsequent amendments and supplements.

Art. 6
Teaching activities and university training credit
(Teaching activities and CFU)

Each training activity, prescribed by the Degree course detail sheet, is measured in CFU. Each CFU corresponds to 25 hours of overall training commitment[3] per student and includes the hours of teaching activities specified in the curriculum as well as the hours reserved for personal study or other individual training activities.
For the Degree Program covered by this Didactic Regulations, the hours of teaching specified in the curriculum for each CFU, established in relation to the type of training activity, are as follows [4]:

- lecture or guided teaching exercises: 8 hours per CFU;
- seminar: 8 hours per CFU;
- laboratory activities or fieldwork: 8 hours per CFU.

For Internship and Thesis activities, each credit corresponds to 25 hours of overall training commitment [5].
The CFU corresponding to each training activity acquired by the student is awarded by satisfying the assessment procedures (examination, pass mark) indicated in the Course sheet relating to the course/activity attached to this Didactic Regulations.

Art. 7
Description of teaching methods

The didactic activity is carried out in modality conventional.
If necessary, the CCD decides which courses also include teaching activities offered online, according to Ministerial Decree 289 of 25 March 2021 (general guidelines for the three-year planning of universities 2021-2023), in Annex 4, letter A.
Some courses may also take place in seminar form and/or involve classroom exercises, language, and computer laboratories.
Detailed information on how each course is conducted can be found in the course sheets.

Art. 8
Testing of training activities[6]

1. The CCD, within the prescribed regulatory limits[7], establishes the number of examinations and other means of assessment that determine the acquisition of credits. Examinations are individual

[3] According to Art. 5, c. 1 of Italian Ministerial Decree No 270/2004, "25 hours of total commitment per student correspond to university training credits; a ministerial decree may justifiably determine variations above or below the aforementioned hours for individual classes, by a limit of 20 per cent".
[4] The number of hours considers the instructions in Art. 6, c. 5 of the RDA: "of the total 25 hours, for each CFU, are reserved: a) 5 to 10 hours for lectures or guided teaching exercises; b) 5 to 10 hours for seminars; c) 8 to 12 hours for laboratory activities or fieldwork, except in the case of training activities with a high experimental or practical content, and subject to different legal provisions or different determinations by DD.MM.".
[5] For Internship activities (Inter-ministerial Decree 142/1998), subject to further specific provisions, the number of working hours equal to 1 CFU may not be less than 25
[6] Article 22 of the University Didactic Regulations.
[7] Pursuant to the DD.MM. 16.3.2007 in each Degree Programs the examinations or profit tests envisaged may not be more than 20 (Bachelor's Degrees; Art. 4. c. 2), 12 (Master's Degrees; Art. 4, c. 2), 30 (five-year single-cycle Degrees) or 36 (six-year single-cycle Degrees; Art. 4, c. 3). Pursuant to the RDA, Art. 13, c. 4, "the assessments that constitute an

and may consist of written, oral, practical, graphical tests, term papers, interviews, or a combination of these modes.

2. The examination procedures published in the course sheets and the examination schedule will be made known to students before the start of classes on the Department's website.[8]
3. Examinations are held subject to booking, which is made electronically. In case the student is unable to book an exam for reasons that the President of the Board considers justifiable, the student may still be admitted to the examination, following those students already booked.
4. Before examination, the President of the Board of Examiners verifies the identity of the student, who must present a valid photo ID.
5. Examinations are marked out of 30. Examinations involving an assessment out of 30 shall be passed with a minimum mark of 18; a mark of 30 may be accompanied by honours by unanimous vote of the Board. Examinations are marked out of 30 or with a simple pass mark. Assessment following tests other than examinations are marked out with a simple pass mark.
6. Oral exams are open to the public. If written tests are scheduled, the candidate has the right to see his/her paper(s) after correction.
7. Examination Boards are governed by the University Didactic Regulations[9].

Art. 9
Degree Program structure and Study Plan

1. The legal duration of the Degree Program is 3 years.
2. The student must acquire 180 CFU[10], attributable to the following Types of Training Activities (TAF):
   A) basic,
   B) characterising,
   C) related or complementary,
   D) at the student's choice (at least 12 CFU)[11],
   E) for the final exam,
   F) further training activities.

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eligibility evaluation for activities referred to in Art. 10, c. 5, letters c), d), and e) of Ministerial Decree no. 270/2004, including the final examination for obtaining the degree, are excluded from the calculation." For Master's Degree Program and single-cycle Master's Degree Program, however, pursuant to the RDA, Art. 14, c. 7, "the assessments that constitute a progress evaluation for activities referred to in Art.10, c. 5, letters d) and e) of Ministerial Decree no. 270/2004 are excluded from the exam count; the final examination for obtaining the Master's Degree and single-cycle Master's Degree is included in the maximum number of exams".

[8] Reference is made to Art. 22, c. 8, of the University Teaching Regulations, which states that "the Department or School ensures that the dates for progress assessments are published on the portal with reasonable advance notice, which normally cannot be less than 60 days before the start of each academic period, and that an adequate period of time is provided for exam registration, which is generally mandatory."

[9] Reference is made to Art. 22, paragraph 4 of the RDA according to which "Examination Boards and other assessments committees are appointed by the Director of the Department or by the President of the School when provided for in the School's Regulations. This function may be delegated to the CCD Coordinator. The Commissions comprise of the President and, if necessary, other professors or experts in the subject. In the case of active courses, the President is the course instructor, and in such cases, the Board can validly make decisions even in the presence of the President alone. In other cases, the President is a professor identified at the time of the Board's appointment. In the comprehensive evaluation of the overall performance at the conclusion of an integrated course, the professors in charge of the coordinated modules participate, and the President is appointed when the Commission is appointed."

[10] The total number of CFU for the acquisition of the relevant degree must be understood as follows: six-year single-cycle Degree, 360 CFU; five-year single-cycle Degree, 300 CFU; Bachelor's Degree, 180 CFU; Master's Degree, 120 CFU.

[11] Corresponding to at least 12 ECTs for Bachelor's Degrees and at least 8 CFU for Master's Degrees (Art. 4, c. 3 of Ministerial Decree 16.3.2007).

3. The degree is awarded after having acquired 180 CFU [see note 9] by passing examinations, not exceeding 20, and the performance of other training activities.
   Unless otherwise provided for in the legal framework of University studies, examinations taken as part of basic, characterising, and related or supplementary activities, as well as activities chosen autonomously by the student (TAF D) are taken into consideration for counting purposes. Examinations or assessments relating to activities independently chosen by the student may be taken into account in the overall calculation corresponding to one unit[12]. Tests constituting an assessment of suitability for the activities referred to in Article 10, paragraph 5, letters c), d) and e) of Ministerial Decree 270/2004[13] are excluded from the count. Integrated Courses comprising of two or more modules are subject to a single examination.
3. To acquire the CFU relating to independent choice activities, the student is free to choose among all the Course offered by the University, provided that they are consistent with the training project. This consistency is assessed by the Didactic Coordination Commission. Also, for the acquisition of the CFU relating to autonomous choice activities the "passing the exam or other form of profit verification" is required (Art. 5, c. 4 of Ministerial Decree 270/2004).
4. The student may also include in the choice credits any internship credits in excess of those provided for in the regulations, subject to approval by the CCD.
5. Choice credits may also be taken in years other than the one foreseen, as long as they do not exceed, in total, those required for the entire degree course.
6. The study plan summarises the structure of the Degree Program, listing the envisaged teachings broken down by course year and, in case, by curriculum. At the end, the propedeuticities envisaged by the Degree Program are listed. The study plan offered to students, with an indication of the scientific-disciplinary sectors and the area to which they belong, of the credits, of the type of educational activity, is set out in Annex 1 to this Didactic Regulations.
7. Pursuant to the Art. 11, paragraph 4-bis, of Ministerial Decree 270/2004, it is possible to obtain the Degree according to an individual study plan that also includes educational activities different from those specified in the Didactic Regulations if they are consistent with Degree course detail sheet of the academic year of enrollment. The individual study plan is approved by CCD.

Art. 10
Attendance requirements[14]

1. In general, attendance of lectures is strongly recommended but not compulsory.
2. If the lecturer envisages a different syllabus modulation for attending and non-attending students, this is indicated in the individual Course detail published on the Degree course web page and on the teacher's UniNA website.

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[12] Pursuant to the D.M. 386/2007.

[13] Art. 10, c. 5 of Ministerial Decree. 270/2004: "In addition to the qualifying training activities, as provided for in paragraphs 1, 2 and 3, Degree Programs shall provide for: a) training activities autonomously chosen by the student as long as they are consistent with the training project [TAF D]; b) training activities in one or more disciplinary fields related or complementary to the basic and characterising ones, also with regard to context cultures and interdisciplinary training [TAF C]; c) training activities related to the preparation of the final exam for the achievement of the degree and, with reference to the degree, to the verification of the knowledge of at least one foreign language in addition to Italian [TAF E]; d) training activities, not envisaged in the previous points, aimed at acquiring additional language knowledge, as well as computer and telematic skills, relational skills, or in any case useful for integration in the world of work, as well as training activities aimed at facilitating professional choices, through direct knowledge of the job sector to which the qualification may give access, including, in particular, training and guidance programs referred to in Decree no. 142 of 25 March 1998 of the Ministry of Labour [TAF F]; e) in the hypothesis referred to in Article 3, paragraph 5, training activities relating to internships and apprenticeships with companies, public administrations, public or private entities including those of the third sector, professional orders and colleges, on the basis of appropriate agreements".

[14] Art. 22, c. 10 of the University Didactic Regulations.

3. Attendance at seminar activities that award training credits is compulsory. The relative modalities for the attribution of CFU are the responsibility of the CCD.

Art. 11
Prerequisites and prior knowledge

1. The list of incoming and outgoing propedeuticities (necessary to sit a particular examination) can be found at the end of Annex 1 and in the teaching/activity course sheet (Annex 2).
2. Any prior knowledge deemed necessary is indicated in the individual Teaching Schedule published on the course webpage and on the teacher's UniNA website.

Art. 12
Degree Program Calendar

The Degree Program calendar can be found on the Department's website well in advance of the start of the activities (Art. 21, c. 5 of the RDA).

Art. 13
Criteria for the recognition of credits earned in other Degree Programs in the same Class[15]

For students coming from Degree Programs of the same class, the Didactic Coordination Commission ensures the full recognition of CFU, when associated with activities that are culturally compatible with the training Degree Program, acquired by the student at the originating Degree Program, according to the criteria outlined in Article 14 below. Failure to recognise credits must be adequately justified. This is without prejudice to the fact that the number of credits relating to the same scientific-disciplinary sector directly recognised by the student may not be less than 50% of those previously achieved. If the course of origin is conducted in distance learning mode, the minimum 50% share is recognised only if the course of origin is accredited pursuant to the ministerial regulation referred to in Article 2, paragraph 148, of Decree-Law No. 262 of 3 October 2006, converted by Law No. 286 of 24 November 2006.

Article 14
Criteria for the recognition of credits acquired in Degree Programs of different classes, in university or university-level Degree Programs, through single courses, at online Universities and in international Degree Programs[16]; criteria for the recognition of credits acquired in extra-curricular activities

1. With regard to the criteria for the recognition of CFU acquired in Degree Programs of different Classes, in university or university-level Degree Programs, through single courses, at online Universities and in International Degree Programs, the credits acquired are recognised by the CCD on the basis of the following criteria:
   - analysis of the activities carried out;
   - evaluation of the congruity of the disciplinary scientific sectors and of the contents of the training activities in which the student has earned credits with the specific training objectives of the Degree Program and of the individual training activities to be recognised.

   Recognition is carried out up to the number of credits envisaged by the didactic system of the Degree Program. Failure to recognise credits must be adequately justified. Pursuant to the Art.

[15] Art. 19 of the University Didactic Regulations.
[16] Art. 19 of the University Didactic Regulations.

5, c. 5-bis, of Ministerial Decree 270/2004, the acquisition of CFU from other Italian universities is also possible, based on agreements established between the concerned institutions in accordance with the current regulations[17].

2. Any recognition of CFU relating to examinations passed as single courses may take place within the limit of 36 CFU, upon request of the interested party and following the approval of the CCD. Recognition may not contribute to the reduction of the legal duration of the Degree Program, as determined by Art. 8, c. 2 of Ministerial Decree 270/2004, except for students who enrol while already in possession of a degree of the same level[18].
3. With regard to the criteria for the recognition of CFU acquired in extra-curricular activities, pursuant to Art. 3, par. 2, of Ministerial Decree (D.M.) 931/2004, within the limit of 48 CFU the following activities may be recognised (Art. 2 of D.M. 931/2024):
   - Professional knowledge and skills, certified in accordance with the current regulations as well as knowledge and skills acquired in post-secondary-level training activities.
   - Training activities carried out in the cycles of study at the public administration training institutions as well as knowledge and skills acquired in post-secondary-level training activities, which the University contributed to developing and implementing.
   - Achievement of an Olympic or Paralympic medal or the title of absolute world champion, absolute European champion or absolute Italian champion in disciplines recognized by the Italian National Olympic Committee or the Italian Paralympic Committee.

Art. 15
Criteria for enrolment in individual teaching courses

Enrolment in individual teaching courses, provided for by the University Didactic Regulations[19], is governed by the "University Regulations for enrolment in individual teaching courses activated as part of the Degree Program"[20].

[17] Art. 6, c. 9 of the University Didactic Regulations.
[18] R.D. No. 3241/2019.
[19] Art. 19, c. 4 of the University Didactic Regulations.
[20] R.D. No. 3241/2019.

Article 16
Features and modalities for the final examination

The final examination for the degree in Biology will consist of a presentation of the results obtained during the activities carried out in a research laboratory, either within the university facilities or at research centres, companies, or external bodies, in accordance with the procedures established by the degree, or of the internship activities carried out in public and private facilities, or of the bibliographical research activities. The discussion of the thesis will take place in the presence of a committee appointed for the purpose and may involve the use of audio-visual aids.

The dissertation activity (after the acquisition of 130 CFU) is carried out by the student with the support of a lecturer, who may be chosen from among the teaching staff of the Biology course of study or those belonging to the science teaching area.

The Degree Committee will meet according to a schedule that will be published on the Biology Department website. The candidates will be announced in public session.
The final mark awarded to the student is obtained by considering the student's career, the final report submitted and the presentation of the paper to the committee. The jury for the final examination shall award the mark in 100ths. By unanimous decision, the committee may award honours to the candidate obtaining the highest mark.

Article 17
Guidelines for traineeship and internship

1. Students enrolled in the Degree Program may decide to carry out internships or training periods with organisations or companies that have an agreement with the University. Traineeship and internship are not compulsory and contribute to the award of credits for the other training activities chosen by the student and included in the study plan, as provided for by Art. 10, par. 5, letters d and e, of Ministerial Decree 270/2004[21].
2. The modalities and characteristics of traineeship and internship are regulated by the CCD with a specific regulation.
3. The University of Naples Federico II, through the Traineeship Office, ensures constant contact with the world of work, to offer students and graduates of the University concrete opportunities for internships and work experience and to promote their professional integration.

Article 18
Disqualification of student status[22]

A student who has not taken any examinations for eight consecutive academic years incurs forfeiture unless his/her contract stipulates otherwise. In any case, forfeiture shall be notified to the student by certified e-mail or other suitable means attesting to its receipt.

Article 19
Teaching tasks, including supplementary teaching, guidance, and tutoring activities

1. Professors and researchers carry out the teaching load assigned to them in accordance with the provisions of the RDA and the Regulations on the teaching and student service duties of

[21] Traineeships ex letter d can be both internal and external; traineeships ex letter e can only be external.
[22] Art. 24, c. 5 of the University Didactic Regulations.

professors and researchers and on the procedures for self-certification and verification of actual performance[23].

2. Professors and researchers must guarantee at least two hours of reception every 15 days (or by appointment in any case granted no longer than 15 days) and in any case guarantee availability by e-mail.
3. The tutoring service has the task of orienting and assisting students throughout their studies and of removing the obstacles that prevent them from adequately benefiting from attending courses, also through initiatives tailored to the needs and aptitudes of individuals.
4. The University ensures guidance, tutoring and assistance services and activities to welcome and support students. These activities are organised by the Schools and/or Departments under the coordination of the University, as established by the RDA in Article 8.

Article 20
Evaluation of the quality of the activities performed

1. The Didactic Coordination Commission implements all the forms of quality assessment of teaching activities envisaged by the regulations in force according to the indications provided by the University Quality Presidium.
2. To guarantee the quality of teaching to the students and to identify the needs of the students and all stakeholders, the University of Naples Federico II uses the Quality Assurance (QA)[24] System, developed in accordance with the document "Self-evaluation, Evaluation and Accreditation of the Italian University System" of ANVUR, using:
   - surveys on the degree of placement of graduates into the world of work and on post-graduate needs;
   - data extracted from the administration of the questionnaire to assess student satisfaction for each course in the curriculum, with questions relating to the way the course is conducted, teaching materials, teaching aids, organisation, facilities.

   The requirements deriving from the analysis of student satisfaction data, discussed, and analysed by the Teaching Coordination Committee and the Joint Teachers' and Students' Committee (CPDS), are included among the input data in the service design process and/or among the quality objectives.
3. The QA System developed by the University implements a process of continuous improvement of the objectives and of the appropriate tools to achieve them, ensuring that planning, monitoring, and self-assessment processes are activated in all the structures to allow the prompt detection of problems, their adequate investigation, and the design of possible solutions.

Article 21
Final Rules

The Department Council, on the proposal of the CCD, submits any proposals to amend and/or supplement these Rules for consideration by the Academic Senate.

[23] R.D No. 2482//2020.

[24] The Quality Assurance System, based on a process approach and adequately documented, is designed in such a way as to identify the needs of the students and all stakeholders, and then translate them into requirements that the training offer must meet.

Article 22
Publicity and Entry into Force

1. These Rules and Regulations shall enter into force on the day following their publication on the University's official notice board; they shall also be published on the University website. The same forms and methods of publicity shall be used for subsequent amendments and additions.
2. Annex 1 (Degree course structure) and Annex 2 (Teaching/Activity course sheet) are an integral part of this Didactic Regulations.

ANNEX 1.1

DEGREE PROGRAM DIDACTIC REGULATIONS

BIOLOGY

CLASS L-13

School: Polytechnic and Basic Sciences

Department: Biology

Didactic Regulations in force since the academic year 2025/26

STUDY PLAN

KEY

Type of Educational Activity (TAF):

A = Basic
B = Characterising
C = Related or Supplementary
D = At the student's choice
E = Final examination and language knowledge
F = Further training activities

Year I									
Title Course	**SSD**	**Module**	**Credits**	**Hours**	**Type Activities** ***(lectures, workshops, etc.)***	**Course Modalities** ***(in-person, by distance)***	**TAF**	**Disciplinary area**	**Mandatory/ optional**
General and Inorganic Chemistry and laboratory	CHIM/03	single	8	64	Frontal lesson/ laboratory	In-person	A	Chemical disciplines	Mandatory
Mathematics	MAT/01-09	single	8	64	Frontal lesson	In-person	A	Mathematical, physical and informatics disciplines	Mandatory
Cytology and Histology and laboratory	BIO/06	single	10	80	Frontal lesson/ laboratory	In-person	A	Biological disciplines	Mandatory
Botany and laboratory	BIO/01	single	10	80	Frontal lesson/ laboratory	In-person	A	Biological disciplines	Mandatory

Physics and elements of informatics	FIS/01-08	single	8	64	Frontal lesson/ laboratory	In-person	A	Mathematical, physical and informatics disciplines	Mandatory
Language laboratory (English 1)	LIN/12	single	4	32	Frontal lesson	In-person/by distance	E	Language knowledge	Mandatory

Year II									
Title course	**SSD**	**Module**	**Credits**	**Hours**	**Type Activities** ***(lectures, workshops, etc.)***	**Course Modalities** ***(in-person, by distance)***	**TAF**	**Disciplinary area**	**Mandatory/ optional**
Organic Chemistry and laboratory	CHIM/06	single	8	64	Frontal lesson/ laboratory	In-person	A	Chemical disciplines	Mandatory
Zoology and laboratory	BIO/05	single	10	80	Frontal lesson/ laboratory	In-person	A	Biological disciplines	Mandatory
Ecology and laboratory	BIO/07	single	10	80	Frontal lesson/ laboratory	In-person	B	Botanical, zoological and ecological disciplines	Mandatory
Biochemistry and laboratory	BIO/10	single	10	80	Frontal lesson/ laboratory	In-person	B	Biomolecular disciplines	Mandatory
Molecular Biology and laboratory	BIO/11	single	10	80	Frontal lesson/ laboratory	In-person	B	Biomolecular disciplines	Mandatory
Developmental biology and animal phylogenesis and laboratory	BIO/06	single	10	80	Frontal lesson/ laboratory	In-person	B	Botanical, zoological and ecological disciplines	Mandatory

Year III									
Title course	**SSD**	**Module**	**CREDITs**	**Hours**	**Type Activities** ***(lectures, workshops etc.)***	**Course Modalities** ***(in-person, by distance)***	**TAF**	**Disciplinary area**	**Mandatory/ optional**

Microbiology and laboratory	BIO/19	single	10	80	Frontal lesson/ laboratory	In-person	B	Biomolecular disciplines	Mandatory
Physiology and laboratory	BIO/09	single	10	80	Frontal lesson/ laboratory	In-person	B	Physiological and biomedical disciplines	Mandatory
Genetics and laboratory	BIO/18	single	10	80	Frontal lesson/ laboratory	In-person	B	Biomolecular disciplines	Mandatory
Plant Physiology and laboratory	BIO/04	single	10	80	Frontal lesson/ laboratory	In-person	C	Related or Supplementary	Mandatory
Related or Supplementary course *(see list A)		single	6	48	Frontal lesson	In-person	C	Related or Supplementary	Mandatory
Related or Supplementary course *(see list A)		single	6	48	Frontal lesson	In-person	C	Related or Supplementary	Mandatory
At the student's choice activity		single	12	96		In-person	D	At the student's choice	Mandatory
Further knowledge useful for job placement		single	6	150		In-person/ by-distance	F	Further knowledge useful for job placement	Mandatory
Thesis Activity			4	100		In-person	E	For Final examination	Mandatory

List A: * Related or Supplementary courses (TAF: C, two among the following list)

Title course	**SSD**	**Module**	**CREDITs**	**Hours**	**Type Activities** ***(lectures, workshops etc.)***	**Course Modalities** ***(in-person, by distance)***
Bioinformatics application in molecular biology	BIO/11	single	6	48	Frontal lesson	In-person
Microbial biotechnology	BIO/19	single	6	48	Frontal lesson	In-person
Applied Ecology	BIO/07	single	6	48	Frontal lesson	In-person
Fundamentals of anatomy of the systems	BIO/06	single	6	48	Frontal lesson	In-person
Fundamentals of Human Physiology	BIO/09	single	6	48	Frontal lesson	In-person
Food hygiene and HACCP	MED/42	single	6	48	Frontal lesson	In-person
Hygiene and laboratory	MED/42	single	6	48	Frontal lesson/ laboratory	In-person
Genetics engineering	BIO/18	single	6	48	Frontal lesson	In-person
General Pathology istitutions	MED/04	single	6	48	Frontal lesson	In-person

Biochemical methodologies and laboratory	BIO/10	single	6	48	Frontal lesson/ laboratory	In-person
Cellular differentiation methods	BIO/13	single	6	48	Frontal lesson	In-person
Comparative Pathology	VET/03	single	6	48	Frontal lesson	In-person
Principles of plant systematics	BIO/02	single	6	48	Frontal lesson	In-person
Vertebrate Zoology	BIO/05	single	6	48	Frontal lesson	In-person

At the student's choice courses						
Title course	**SSD**	**Module**	**CREDITs**	**Hours**	**Type Activities** ***(lectures, workshops etc.)***	**Course Modalities** ***(in-person, by distance)***
Biochemical - clinical analyses	BIO/10	single	6	48	Frontal lesson	In-person
Molecular Biology applied to diagnostics	BIO/11	single	6	48	Frontal lesson	In-person
Molecular Biology of the environment	BIO/11	single	6	48	Frontal lesson	In-person
Marine biology	BIO/07	single	6	48	Frontal lesson	In-person
Soil ecology	BIO/07	single	6	48	Frontal lesson	In-person
Cellular Physiology	BIO/09	single	6	48	Frontal lesson	In-person
Molecular Biology Laboratory	BIO/11	single	6	48	Frontal lesson	In-person
Mathematical method and models	MAT/07	single	6	48	Frontal lesson	In-person
Neurobiology	BIO/09	single	6	48	Frontal lesson	In-person
Adipose Organ and Control of Body Weight	BIO/09	single	6	48	Frontal lesson	In-person
Principles of Nutrition Physiology	BIO/09	single	6	48	Frontal lesson	In-person
Psycobiology	BIO/09	single	6	48	Frontal lesson	In-person
Cytological and histological techniques	BIO/06	single	6	48	Frontal lesson	In-person
Ultrastructure of protoplasm	BIO/06	single	6	48	Frontal lesson	In-person
Elements of computational modeling	CHIM/02	single	6	48	Frontal lesson	In-person
Physico-chemical methods for the study of biological systems	CHIM/02	single	6	48	Frontal lesson	In-person
Mycology and Lichenology	BIO/01	single	6	48	Frontal lesson	In-person

List of propaedeuticities

The exams in Mathematics, General and Inorganic Chemistry and laboratory, Physics and Elements of Computer Science are propaedeutics to the third-year exams.
The specific propaedeuticities requirements are indicated on the schedule for each course.

ANNEX 2.1

DEGREE PROGRAM DIDACTIC REGULATIONS

BIOLOGY

CLASS L-13

School: Polytechnic and Basic Sciences

Department: Biology

Didactic Regulations in force since the academic year 2025/26

Course: General and Inorganic Chemistry and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): CHIM/03	**CREDITS:** 8
Course year: first	**Type of Educational Activity: A –** basic
Teaching Methods: In-person	
Contents extracted from the SSD declaratory consistent with the training objectives of the course: General and Inorganic Chemistry deals with the chemical properties of elements and their inorganic compounds, both natural and synthetic, in their theoretical and practical aspects, based on the study and in-depth analysis of the periodic table of elements.	
Objectives: The course aims to provide students with theoretical and practical knowledge of the basic concepts of General and Inorganic Chemistry, enabling them to understand the phenomena underlying chemical processes through the concepts of atoms and molecules. Numerical exercises and laboratory work will allow students to grasp the structure/property implications and make useful predictions about the behavior of matter. Moreover, students will have the opportunity to establish connections between basic chemistry, learned during the course, and chemical concepts that are more closely related to the three-year biology degree program areas of study.	
Propaedeuticities: None **Is a propaedeuticity for:** Organic chemistry and laboratory, third year exams, Element of computational modeling	
Types of examinations and other tests: Written and oral examination	

Course: Mathematics	**Teaching Language:** Italian
SSD (Subject Areas): MAT/01, 02, 03, 04, 05, 06, 07, 08, 09	**CREDITS:** 8
Course year: first	**Type of Educational Activity: A –** basic
Teaching Methods: In-person	
Contents extracted from the SSD declaratory consistent with the training objectives of the course: Introduction to Set Theory, approach to the study of algebraic and geometrical structures (algebraic structures on numerical sets, linear algebra and plane analytical geometry), introduction to Mathematical Analysis (the basics of differential calculus and of integral calculus of functions of one real variable), elements of Probability and Statistics.	

Objectives:
The course aims to provide language, notions and basic mathematical tools useful for the description and understanding of the topics related to the disciplines covered in the Degree Programme in Biology.

Propaedeuticities:
None

Is a propaedeuticity for:
Third year exams

Types of examinations and other tests:
Written and oral examination

Course: Cytology and Histology and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): BIO/06	**CREDITS:** 10
Course year: first	**Type of Educational Activity: A –** basic

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
The sector addresses and studies the animal form, at its various levels of organization and in the dual structural and embryological-evolutionary perspective. The fundamental correlations between the molecular, cellular, tissue and organ levels are explored in depth, with the use of advanced techniques: microscopic, cytochemical, immunohistochemical, karyological, cytotoxicological. The sector includes, among others, animal cytology and histology and cell biology as characterizing disciplines.

Objectives:
The course aims to provide students with the basic notions of cytology and the mechanisms of interaction and aggregation between cells for the formation of biological tissues. The objective is to provide students with the tools to recognize the different cell and tissue types, to use the optical microscope and to prepare histological stains.

Propaedeuticities:
None

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Botany and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): BIO/01	**CREDITS:** 10
Course year: first	**Type of Educational Activity: A –** basic

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
The sector studies plant biology at all levels of organization, including autotrophic prokaryotes, algae and fungi, as well as their symbioses. General Botany investigates, theoretically and experimentally, the aspects of structural and functional organization and their evolution of these organisms, to establish their relationships and interpret, from an evolutionary perspective, their structures and functions, as well as their reproductive mechanisms. It delves into the ways in which cells and organs acquire the ability to carry out specialized functions and the steps of the processes that lead to the formation of complex organisms and the optimization of the reproductive process; highlights the relationships between cytological, ultrastructural, histological, anatomical, morphological, organographic, physiological aspects and the role of secondary metabolites, framing them in the characteristics of the development

environment, as well as the molecular bases of plant development, with particular regard to embryology and morphogenesis.

Objectives:
Allow the acquisition of basic knowledge on the structure, function, evolution, diversity and reproduction of plant organisms, including autotrophic prokaryotes, algae and fungi, as well as their symbioses.

Propaedeuticities:
None

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Physics and elements of informatics	**Teaching Language:** Italian
SSD (Subject Areas): FIS/01, FIS/02, FIS/03, FIS/04, FIS/05, FIS/06, FIS/07, FIS/08	**CREDITS:** 8
Course year: first	**Type of Educational Activity: A –** basic

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
It includes skills for the study of physical methodologies (theoretical and experimental) necessary both for the description and understanding of living matter in the environmental, biological and medical context, and for the use of instrumentation, including simple computer tools, e.g. spreadsheets, necessary for the control and detection of physical phenomena in the life sciences.

Objectives:
The course aims to provide students with the basic notions necessary for the correct interpretation of physical phenomena of major interest to the life sciences, in order to place them coherently within the general theoretical framework. The various concepts will therefore be provided by contextualizing them in areas of interest in Biology.

Propaedeuticities:
None

Is a propaedeuticity for:
Third year exams

Types of examinations and other tests:
Written and oral examination

Course: Organic Chemistry and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): CHIM/06	**CREDITS:** 8
Course year: second	**Type of Educational Activity: A –** basic

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Organic Chemistry is the branch of chemistry dedicated to the study, scientific and educational in-depth study of carbon compounds, both of natural (animal, vegetable and marine) and synthetic origin, including amino acids and their polymers, lipids and sugars. The following are the object of study: 1) the structure, nomenclature, natural sources, physical properties and reactivity of the main functional groups of the most important classes of organic compounds; 2) the development of efficient and environmentally friendly synthesis methodologies (also based on (stereo)selective and catalytic approaches); 3) the elucidation of the mechanisms through which organic compounds are formed and transformed; 4) structural characterization and structure-reactivity relationships.

The knowledge and skills of the different aspects of Organic Chemistry are fundamental both for basic teaching in multiple and different scientific fields and for advanced disciplines and at a higher degree of complexity and depth.

Objectives:

The course aims to provide the student with the contents and the method to acquire skills in the knowledge and understanding of: i) the structure-property-reactivity relationships of the main families of organic compounds; ii) the principles that guide organic reactions and that allow the rational interpretation of the main reaction mechanisms; iii) the centrality of the organic chemistry discipline at the interface with similar disciplines such as biochemistry and pharmaceutical chemistry.

Propaedeuticities:

General and Inorganic Chemistry and laboratory

Is a propaedeuticity for:

Biochemistry and laboratory, Plant Physiology and laboratory

Types of examinations and other tests:

Oral examination

Course: Zoology and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): BIO/05	**CREDITS:** 10
Course year: second	**Type of Educational Activity: A –** basic

Teaching Methods:

In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:

Study of protozoans and metazoans, and their evolution at the cellular, organismal, population, and species organization levels. Research conducted through theoretical and experimental methodologies, in the field and the laboratory, investigates functional organization, reproduction, morphogenesis, development, and intra- and interspecific interactions with the environment.

Objectives:

Provide students with basic knowledge of general zoology and fauna study methodologies, with an integrated adaptive approach. Broad-spectrum understanding of the biological world, from protozoa to metazoa, with an eye on the evolution of animal characteristics and the environment in which they live. The knowledge provided by the course will allow Biology students to operate in the conservation of animal biodiversity.

Propaedeuticities:

None

Is a propaedeuticity for:

None

Types of examinations and other tests:

Oral examination

Course: Ecology and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): BIO/07	**CREDITS:** 10
Course year: second	**Type of Educational Activity: B** - characterizing

Teaching Methods:

In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:

Relationships of autotrophic and heterotrophic organisms - terrestrial, marine and freshwater - with their environment, biotic interactions, variability of ecological systems and the role of disturbance, population dynamics and regulation, community ecology, biodiversity, energy flow and the matter cycle, ecosystem processes, sustainability of the biosphere, natural capital, conservation and management of ecosystems and biodiversity.

Objectives:
The course aims to provide basic understanding of the relationships between organisms and the environment and among different organisms.

Propaedeuticities:
None

Is a propaedeuticity for:
Applied Ecology, Soil ecology

Types of examinations and other tests:
Oral examination

Course: Biochemistry and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): BIO/10	**CREDITS:** 10
Course year: second	**Type of Educational Activity: B** - characterizing

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Biological processes at the molecular level, the structure, properties, and functions of biomolecules, including proteins and nucleic acids; the molecular and regulatory mechanisms of biotransformations, enzymatic catalysis, metabolism, fermentations; biochemical methodologies for the identification, characterization, and analysis of biomolecules.

Objectives:
The aim of the course is to provide basic knowledge on the structural and functional characteristics of proteins, enzymes, nucleic acids, carbohydrates, and lipids and on the main metabolic processes that will be described with the aim of illustrating the anabolic and catabolic processes and their regulation and to develop the ability to apply basic biochemical methodologies.

Propaedeuticities:
Organic chemistry and laboratory

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Molecular Biology and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): BIO/11	**CREDITS:** 10
Course year: second	**Type of Educational Activity: B** - characterizing

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Molecular biology studies the biological functions at the molecular level of informational macromolecules. This field is interested in analysing the biochemical and evolutionary characteristics of nucleic acids, the interactions between nucleic acids and proteins, between proteins and proteins, and the relationships between the three-dimensional structure of proteins and nucleic acids and their biological functions in all organisms, viruses, prokaryotes, and eukaryotes. Special attention is directed towards macromolecules involved in storing, repairing, transcribing, and translating the information contained in nucleic acids. The above topics are addressed using genetic engineering techniques, biochemical characterization methods of biological macromolecules, and bioinformatics tools.

Objectives:

The course aims to provide basic theoretical and operational skills of the molecular mechanisms underlying the main biological processes concerning, above all, the maintenance of genetic information and its expression in microorganisms, animal and plant organisms.

Propaedeuticities:
None

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Developmental biology and animal phylogenesis and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): BIO/06	**CREDITS:** 10
Course year: second	**Type of Educational Activity: B** - characterizing

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
The disciplines included in the sector represent an integrated set of skills that addresses the problem of form in animal biology, at its various levels of organization and in the dual structural and embryological-evolutionary perspective. From a structural point of view, the fundamental correlations between the molecular, cellular, tissue and organological levels are explored in depth; from an embryological-evolutionary point of view, the relationships between phylogenesis and morphogenesis are studied. The sector includes developmental biology and evolutionary biology of vertebrates, comparative anatomy, cell biology, animal cytology and histology as characterizing disciplines.

Objectives:
The course aims to provide students with basic notions regarding the knowledge of: 1) reproductive and developmental mechanisms of the main classes of Vertebrates, and the main mechanisms that regulate morphogenesis and embryonic development; 2) the phylogenesis of Chordates and the evolution of Vertebrates, considering their adaptations to different lifestyles.

Propaedeuticities:
None

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Microbiology and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): BIO/19	**CREDITS:** 10
Course year: third	**Type of Educational Activity: B** - characterizing

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Bacterial and viral morfology, genetics, phisiology and classification; interactions between microorganisms; Bacteria as models to study complex biological processes.

Objectives:
The aim of the course is to provide students with basic knowledge relating to the structure of microorganisms and microbial physiology and metabolism. Information will also be provided on laboratory methods for the isolation of

microorganisms from the environment, the preparation of microbial cultures and techniques for controlling microbial growth.

Propaedeuticities:
General and Inorganic Chemistry and laboratory, Mathematics, Physics and elements of informatics

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Physiology and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): BIO/09	**CREDITS:** 10
Course year: third	**Type of Educational Activity: B** - characterizing

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Physiology analyzes how the living organism obtains and maintains the homeostasis of its internal medium at the molecular, cellular and tissue level, in response to changes of the surrounding environment

Objectives:
The course aims to provide students with the basic notions of physiology focusing on the functional mechanisms of cells and communication among them. The student needs to learn how to integrate this knowledge to understand the homeostatic control mechanisms of living systems.

Propaedeuticities:
General and Inorganic Chemistry and laboratory, Mathematics, Physics and elements of informatics

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Genetics and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): BIO/18	**CREDITS:** 10
Course year: third	**Type of Educational Activity: B** - characterizing

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
The sector studies the transmission, modification, and expression of hereditary characteristics at the level of prokaryotic and eukaryotic cells, individuals, and populations. It defines and analyzes the structure of genetic material and its levels of organization in microbial, plant, and animal systems, including humans. It analyzes the structure and evolution of genes and genomes. It studies the regulation of gene expression and mechanisms of mutagenesis. It investigates the genetic and molecular bases of evolution, development, immune response, behavior, and hereditary diseases.

Objectives:
The educational objective of the course is to provide students with the knowledge and essential methodological tools necessary to analyze the transmission of hereditary characteristics. The methodological tools will be acquired through the description and analysis of genetics experiments, and the knowledge will be gained through interpreting experimental results. These tools will allow students, through the application of logical-deductive principles, to understand the causes of the main problems of formal and molecular genetics and to grasp their evolutionary implications.

Propaedeuticities: General and Inorganic Chemistry and laboratory, Mathematics, Physics and elements of informatics **Is a propaedeuticity for:** None
Types of examinations and other tests: Oral examination

Course: Plant Physiology and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): BIO/04	**CREDITS:** 10
Course year: third	**Type of Educational Activity: C** – related or supplementary
Teaching Methods: In-person	
Contents extracted from the SSD declaratory consistent with the training objectives of the course: Basic and applied aspects relating to the functions and vital mechanisms, as well as the systems biology of photosynthesizing organisms and their interaction with the environment.	
Objectives: The disciplinary sector includes the study of the functions and vital mechanisms of plant organisms. The sector therefore includes general aspects such as the physiology, biochemistry and molecular biology of plants and more specific ones such as photobiology, bioenergetics and growth regulators.	
Propaedeuticities: General and Inorganic Chemistry and laboratory, Mathematics, Physics and elements of informatics, Organics chemistry and laboratory **Is a propaedeuticity for:** None	
Types of examinations and other tests: Oral examination	

Related or supplementary courses

Course: Bioinformatics application in molecular biology	**Teaching Language:** Italian
SSD (Subject Areas): BIO/11	**CREDITS:** 6
Course year: third	**Type of Educational Activity: C** – related or supplementary
Teaching Methods: In-person	
Contents extracted from the SSD declaratory consistent with the training objectives of the course: Molecular biology studies the biological functions at the molecular level of informational macromolecules. This field is interested in analysing interactions between nucleic acids and proteins, as well as between proteins themselves. Special attention is directed towards macromolecules involved in repairing, transcribing, and translating the information contained in nucleic acids. Additionally, focus is placed on macromolecules responsible for controlling gene expression, proliferation, cellular differentiation, and transformations.	
Objectives: The course aims to provide basic bioinformatics knowledge and their application in molecular biology. By understanding these applications, it will be possible to guide the student in the consultation and analysis of biological databases, in the analysis of sequences and gene expression and in epigenomics.	
Propaedeuticities: None	

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Microbial biothechnology	**Teaching Language:** Italian
SSD (Subject Areas): BIO/19	**CREDITS:** 6
Course year: third	**Type of Educational Activity: C** – related or supplementary

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Applied microbial biotechnologies

Objectives:
Aim of the course is to provide students with basic knowledge relating to the use of microorganisms for the production of molecules of pharmaceutical and food interest, for bioremediation and environmental monitoring.

Propaedeuticities:
None

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Applied Ecology	**Teaching Language:** Italian
SSD (Subject Areas): BIO/07	**CREDITS:** 6
Course year: third	**Type of Educational Activity: C** – related or supplementary

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Global change and anthropogenic alterations, conservation and management of ecosystems, utilization of biological resources, strategies for the maintenance of biodiversity and sustainability of the biosphere, environmental quality indicators, environmental impact assessment, ecological aspects of environmental remediation and restoration, ecological systems analysis.

Objectives:
The course aims to provide the knowledge and analytical tools necessary to assess the effects of the main anthropogenic activities on natural ecosystems; knowledge of the main mitigation and restoration strategies for degraded environments.

Propaedeuticities:
Ecology

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Fundamentals of anatomy of the systems	**Teaching Language:** Italian
SSD (Subject Areas):	**CREDITS:**

BIO/06	6
Course year: third	**Type of Educational Activity: C –** related or supplementary

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
The disciplines included in the sector represent an integrated set of skills that addresses the problem of form in animal biology, at its various levels of organization and in the dual structural and embryological-evolutionary perspective. From a structural point of view, the fundamental correlations between the molecular, cellular, tissue and organological levels are explored in depth. From an embryological-evolutionary point of view, we study, also with a comparative approach, the interconnection between structure, function and adaptation, in various processes such as reproduction, development, endocrine and neural integration, immune defense. The sector includes comparative anatomy, cell biology, developmental biology and evolutionary biology of vertebrates, animal cytology and histology as characterizing disciplines.

Objectives:
The objective is to provide students with basic knowledge of human anatomy by examining the different systems. The course involves the study of the main organs also taking into consideration the relationships between structure and function of the various parts of the human body, of which the main evolutionary traits will also be analysed.

Propaedeuticities:
None

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Fundamentals of Human Physiology	**Teaching Language:** Italian
SSD (Subject Areas): BIO/09	**CREDITS:** 6
Course year: third	**Type of Educational Activity: C –** related or supplementary

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Physiology analyzes the integrated functioning of the different organs and systems

Objectives:
The course aims to make students understand the functional mechanisms of organs and systems, allowing them to integrate this knowledge to understand the homeostatic control mechanisms of living systems.

Propaedeuticities:
None

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Food hygiene and HACCP	**Teaching Language:** Italian
SSD (Subject Areas): MED/42	**CREDITS:** 6
Course year: third	**Type of Educational Activity: C –** related or supplementary

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:

The sector is involved in scientific and didactic-educational activities, along with related assistance activities in the areas of general and applied hygiene. It possesses specific expertise in applied hygiene in the workplace, food hygiene and nutrition, health service management, and health education.

Objectives:

The course aims to provide knowledge of food hygiene and production technologies, inspection and control of products for human consumption, as well as an understanding of physical, chemical, and microbiological hazards in the food industry and related regulations. The course also covers prevention techniques, with a particular focus on self-control systems (HACCP).

Propaedeuticities:

None

Is a propaedeuticity for:

None

Types of examinations and other tests:

Written examination

Course: Hygiene and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): MED/42	**CREDITS:** 6
Course year: third	**Type of Educational Activity: C –** related or supplementary

Teaching Methods:

In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:

The sector is engaged in scientific and didactic-educational activities, along with related assistance activities, in the fields of general and applied hygiene. The sector has specific expertise in environmental hygiene, preventive medicine, epidemiology, and public health.

Objectives:

Students must understand the cultural foundations and technological competences necessary for studying health, diseases, and risk factors. They will gain knowledge of the causes and prevention of diseases, diagnostic techniques, and will master critical analyses and descriptors of disease, pollution, and quality in water and food.

Propaedeuticities:

None

Is a propaedeuticity for:

None

Types of examinations and other tests:

Written examination

Course: Genetics engineering	**Teaching Language:** Italian
SSD (Subject Areas): BIO/18	**CREDITS:** 6
Course year: third	**Type of Educational Activity: C –** related or supplementary

Teaching Methods:

In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:

It focuses on the genetic dissection and manipulations of hereditary material used for the purpose of understanding biological phenomena. It describes practical applications of Genetics and the molecular technologies derived from it, such as genetic engineering and transgenesis in the biomedical, pharmaceutical, agri-food, industrial and environmental sectors.

Objectives:
The course aims to provide students with the conceptual and technical knowledge of molecular biotechnologies underlying the cloning of genes and their introduction, and consequent expression, in cells and model organisms. The student must demonstrate that they understand and are able to develop a discussion on the use of recombinant DNA technology.

Propaedeuticities:
None

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: General Pathology istitutions	**Teaching Language:** Italian
SSD (Subject Areas): MED/04	**CREDITS:** 6
Course year: third	**Type of Educational Activity: C** – related or supplementary

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
General pathology and general pathophysiology; basic and applied research including the study of cellular pathology with specific skills in the field of oncology, immunology and immunopathology and genetic pathology.

Objectives:
The course aims to provide students with the elements to analyze the causes (etiology) and mechanisms (pathogenesis) that contribute to the establishment of a pathological state. At the end of the course, the student must demonstrate that is able to recognize and identify the causes and mechanisms that contribute to the establishment of a disease state.

Propaedeuticities:
Cytology and Histology and laboratory; Biochemistry and laboratory; Microbiology and laboratory; Molecular Biology and laboratory; Physiology and laboratory**.**

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Biochemical methodologies and laboratory	**Teaching Language:** Italian
SSD (Subject Areas): BIO/10	**CREDITS:** 6
Course year: third	**Type of Educational Activity: C** – related or supplementary

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Biochemical methodologies for the identification, characterization, and analysis of biomolecules.

Objectives:
The aim of the course is to provide basic knowledge relating to the determination, purification, and analysis of biological macromolecules, with particular reference to proteins and enzymes.

Propaedeuticities:
Biochemistry and laboratory

Is a propaedeuticity for:

None

Types of examinations and other tests:
Oral examination

Course: Cellular differentiation methods	**Teaching Language:** Italian
SSD (Subject Areas): BIO/13	**CREDITS:** 6
Course year: third	**Type of Educational Activity: C –** related or supplementary

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
The sector is interested in scientific and educational-training activities in the field of the integrative study of the cell and of living organisms, with particular attention to the basic mechanisms involved in the process of cellular differentiation and proliferation. It also promotes the strengthening of biotechnological methodologies and their technology transfer. The learning path of cell and applied biology is focused on generating and characterizing *in vitro* study models using conventional and advanced genetic engineering.

Objectives:
The course aims to provide students with the notions relating to the molecular mechanisms underlying the differentiation processes of stem and somatic cells, paying particular attention to the molecular issues that regulate these processes. Among the training objectives, the course places particular attention on the theoretical principles underlying the main technologies and methodologies used for cellular differentiation in vitro, in vivo and ex vivo. The student will have the opportunity to learn how stem and somatic cell differentiation processes are functional to understanding the pathophysiology of organs and tissues of model systems. The training course will provide the appropriate tools to develop the student's critical ability of the topics covered with implications for innovation and technological transfer. the skills necessary for the generation of conventional and innovative cellular models will be provided. The role that the cellular microenvironment plays in the process of development and differentiation of the skin and the methodologies useful for understanding the molecular and cellular mechanisms that regulate its pathophysiology will be addressed.

Propaedeuticities:
Molecular Biology and laboratory; Genetic and laboratory; Biochemistry and laboratory

Is a propaedeuticity for:
None

Types of examinations and other tests:
Written and oral examination

Course: Comparative Pathology	**Teaching Language:** Italian
SSD (Subject Areas): VET/03	**CREDITS:** 6
Course year: third	**Type of Educational Activity: C –** related or supplementary

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
The sector includes the disciplines and research topics associated to the etiopathogenesis of diseases, according to the approach of general veterinary and comparative pathology, to the macroscopic and microscopic analysis of systemic pathologies and of individual nosological entities.

Objectives:
Knowledge of the general principles of comparative pathology of vertebrate and invertebrate animals in an evolutionary context

Propaedeuticities:
None
Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Principles of plant systematics	**Teaching Language:** Italian
SSD (Subject Areas): BIO/02	**CREDITS:** 6
Course year: third	**Type of Educational Activity: C** – related or supplementary

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Systematic Botany has as its object the taxonomic and biological diversity of plants; Systematic Botany includes the recognition and constitution of elementary taxa, the theory and classificatory techniques of diversity groups, their projection into concrete taxonomic systems.

Objectives:
The course provides in-depth knowledge of the classification, systematics, phylogeny and, more generally, the biology of the main plant taxa. It also provides methodological and operational skills on the identification and classification of plant organisms

Propaedeuticities:
None
Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Vertebrate Zoology	**Teaching Language:** Italian
SSD (Subject Areas): BIO/05	**CREDITS:** 6
Course year: third	**Type of Educational Activity: C** – related or supplementary

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Study of metazoans and their evolution at cellular, organismal, population and species, and community levels of organization. Research, conducted through theoretical and experimental methodologies, in the field and the laboratory, on functional organization, biogeography, systematics, and phylogeny.

Objectives:
Acquisition of knowledge on the anatomy, physiology, ecology, evolutionary history, and classification of vertebrates. Acquisition of skills in classifying and recognizing vertebrates through practical activities on models and/or museum specimens' representative of the different taxa.

Propaedeuticities:
None
Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

At the student's choice courses

Course: Biochemical - clinical analyses	**Teaching Language:** Italian
SSD (Subject Areas): BIO/10	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice
Teaching Methods: In-person	
Contents extracted from the SSD declaratory consistent with the training objectives of the course: Biochemical methodologies for the identification, characterization and analysis of biomolecules. Biochemical bases of pathological states. Biochemical and biotechnological applications offered by all the skills listed above regarding proteins, nucleic acids, lipids, and sugars in the medical field	
Objectives: The objective of this course is to provide students with the skills to work in a healthcare diagnostic laboratory.	
Propaedeuticities: Biochemistry and laboratory; Physiology and laboratory **Is a propaedeuticity for:** None	
Types of examinations and other tests: Oral examination	

Course: Molecular Biology applied to diagnostics	**Teaching Language:** Italian
SSD (Subject Areas): BIO/11	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice
Teaching Methods: In-person	
Contents extracted from the SSD declaratory consistent with the training objectives of the course: Molecular biology studies the biological functions at the molecular level of informational macromolecules. This field is interested in analysing interactions between nucleic acids and proteins, as well as between proteins themselves. Special attention is directed towards macromolecules involved in repairing, transcribing, and translating the information contained in nucleic acids. Additionally, focus is placed on macromolecules responsible for controlling gene expression, proliferation, cellular differentiation, and transformations.	
Objectives: The course of Molecular Biology Applied to Diagnostics aims to provide a deeper and more comprehensive understanding of molecular basis, methodologies, and biomolecular techniques used in diagnostics. Special attention will be given to potential applications in the health, forensic, and agri-food fields.	
Propaedeuticities: Molecular Biology and Laboratory **Is a propaedeuticity for:** None	
Types of examinations and other tests: Oral examination	

Course: Molecular Biology of the environment	**Teaching Language:** Italian
SSD (Subject Areas):	**CREDITS:**

BIO/11	6
Course year: third	**Type of Educational Activity: D –** at student's choice

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Molecular biology studies the biological functions at the molecular level of informational macromolecules. Of interest in this field is the analysis of the biochemical characteristics of nucleic acids, the interactions between nucleic acids and proteins, between proteins and proteins, and the relationships between the three-dimensional structure of proteins and nucleic acids and the biological functions they perform in all eukaryotes. Particular attention is paid to macromolecules that are involved in the transcription and translation of information contained in nucleic acids, macromolecules that are responsible for the phenomena controlling gene expression, proliferation, differentiation.

Objectives:
The course will train students to understand the molecular mechanisms underlying the effects of environmental pollutants on the reproductive health of humans and marine organisms, with a focus on understanding alterations in chromatin structure and dynamics and the transcriptional mechanisms that regulate gene expression. Objectives include understanding the methodological analyses used in genomics, transcriptomics, epigenomics.

Propaedeuticities:
None

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Marine biology	**Teaching Language:** Italian
SSD (Subject Areas): BIO/07	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Autotrophic and heterotrophic organisms in the marine environment. Biotic interactions (predation, competition, parasitism, symbiosis), resource utilisation and marine population dynamics. Marine communities, spatio-temporal variations and mechanisms regulating marine biodiversity. Responses of marine ecosystems to global changes and anthropogenic alterations.

Objectives:
The course aims to provide the basics of the marine ecosystem and the structural and functional aspects of communities in pelagic and benthic environments. The mechanisms underlying production cycles and their spatio-temporal evolution in different marine ecological contexts will be addressed. Particular attention will be devoted to the concepts of biodiversity and sustainability as a tool for theoretical and applied analysis, and for assessing changes in marine ecosystems in relation to ongoing climate warming.

Propaedeuticities:
None

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Soil ecology	**Teaching Language:** Italian
SSD (Subject Areas):	**CREDITS:**

BIO/07	6
Course year: third	**Type of Educational Activity: D –** at student's choice
Teaching Methods: In-person	
Contents extracted from the SSD declaratory consistent with the training objectives of the course: Natural, man-made, urban-industrial ecosystems and their organization in landscape systems; conservation and management of ecosystems; control of exotic species; strategies for maintaining biodiversity and sustainability of the biosphere; indicators of environmental quality.	
Objectives: The course aims to provide in-depth knowledge of soil structure and functions and the application of techniques for the identification of quality indicators.	
Propaedeuticities: Ecology and laboratory **Is a propaedeuticity for:** None	
Types of examinations and other tests: Oral examination	

Course: Cellular Physiology	**Teaching Language:** Italian
SSD (Subject Areas): BIO/09	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice
Teaching Methods: In-person	
Contents extracted from the SSD declaratory consistent with the training objectives of the course: Physiology studies the functional mechanisms of transport and communication system in biological membranes.	
Objectives: The course aims to provide the basic knowledge necessary to understand the functions of cell membranes, the modes communication mechanisms between cells and between cells and the environment.	
Propaedeuticities: Physiology and laboratory **Is a propaedeuticity for:** None	
Types of examinations and other tests: Oral examination	

Course: Molecular Biology Laboratory	**Teaching Language:** Italian
SSD (Subject Areas): BIO/11	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice
Teaching Methods: In-person	
Contents extracted from the SSD declaratory consistent with the training objectives of the course: This field is interested in analysing the biochemical and evolutionary characteristics of nucleic acids, the interactions between nucleic acids and proteins, between proteins and proteins, and the relationships between the three-dimensional structure of proteins and nucleic acids and their biological functions in all organisms, viruses, prokaryotes,	

and eukaryotes. The above topics are addressed using genetic engineering techniques, biochemical characterization methods of biological macromolecules, and bioinformatics tools.

Objectives:
One of the objectives of the course is to provide students with knowledge of the main molecular techniques applicable to the study of cells and living organisms. A further objective is to make the student acquire the ability to interpret scientific data, strengthening a critical vision of experimental data and the use of molecular biology techniques in several areas of application.

Propaedeuticities:
Molecular Biology and Laboratory

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Mathematical method and models	**Teaching Language:** Italian
SSD (Subject Areas): MAT/07	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Skills relating to the study, from both a theoretical and applicative point of view, of dynamic systems, using both analytical and geometric techniques**.**

Objectives:
Illustrate how and why mathematical models are built. Provide examples of mathematical models for dealing with problems from biology, ecology and natural sciences in general.

Propaedeuticities:
Mathematics

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Neurobiology	**Teaching Language:** Italian
SSD (Subject Areas): BIO/09	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Physiology studies biophysics, the electrophysiological and functional mechanisms of transport and communication systems in biological membranes, as well as the mechanisms and relationships of all vegetative functions.

Objectives:
The course aims to provide the basic knowledge necessary to understand the functions of Nervous System from the molecular to the systemic level.

Propaedeuticities:
Physiology and laboratory

Is a propaedeuticity for:

None

Types of examinations and other tests:
Oral examination

Course: Adipose Organ and Control of Body Weight	**Teaching Language:** Italian
SSD (Subject Areas): BIO/09	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Physiology studies the specialized functions of individual cells and the general basis of endocrinology.

Objectives:
The course aims to provide students with the elements related to the morphology and function of the adipose organ, to the mechanisms underlying the different functions of the white and brown adipose tissues as well as to the endocrine role of the adipose organ, which will allow understanding the role played by the adipose organ in the control of body weight and the pathophysiological consequences associated with adipose organ dysfunction.

Propaedeuticities:
None

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral e examination

Course: Principles of Nutrition Physiology	**Teaching Language:** Italian
SSD (Subject Areas): BIO/09	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Physiology evaluates the physiological use of nutrients in the diet.

Objectives:
The course aims to provide the basic knowledge necessary to understand the physiology of digestive function and energy homeostasis.

Propaedeuticities:
Physiology and laboratory

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Psycobiology	**Teaching Language:** Italian
SSD (Subject Areas): BIO/09	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
Physiology studies the neurobiological and psychophysiological principles related to behavior and to cognitive and emotional interactions between the subject and the environment.

Objectives:
The course aims to provide the knowledge to understand the physiological mechanisms underlying behavior and mental processes.

Propaedeuticities:
Physiology and laboratory

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Cytological and histological techniques	**Teaching Language:** Italian
SSD (Subject Areas): BIO/06	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
The sector deals with and studies the animal form, at its various levels of organization and in the dual structural and embryological-evolutionary perspective. The fundamental correlations between the molecular, cellular, tissue and organological levels are explored in depth, with the use of advanced techniques: microscopic, cytochemical, immunohistochemical, karyological, cytotoxicological.

Objectives:
Understanding microscopy techniques: nature and behaviour of light; image formation; preparation of biological material. Motivations for the execution of different types of technique, in relation to the type of study and optical instruments used.

Propaedeuticities:
Cytology and histology and laboratory

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Ultrastructure of protoplasm	**Teaching Language:** Italian
SSD (Subject Areas): BIO/06	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
The disciplines included in the sector represent an integrated set of skills that addresses the problem of form in animal biology, at its various levels of organization and in the dual structural and embryological-evolutionary perspective.

The sector includes developmental biology and evolutionary biology of vertebrates, comparative anatomy, cell biology, animal cytology and histology as characterizing disciplines.

Objectives:

Provide knowledge on the ultrastructure of cells in Vertebrates with particular attention to some cellular organelles whose alterations are characteristic of specific diseases.

Propaedeuticities:

Cytology and histology and laboratory

Is a propaedeuticity for:

None

Types of examinations and other tests:

Oral examination

Course: Elements of computational modeling	**Teaching Language:** Italian
SSD (Subject Areas): CHIM/02	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice

Teaching Methods:

In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:

Description, both at a macroscopic and at an atomic/molecular level, of the structure, properties, and transformations of material systems. Interpretative models, based on experimental and computational methods, for the prediction of experimental parameters and for the solution of problems relating to complex systems of chemical and biological interest.

Objectives:

The course aims at building the knowledge needed for a conscious and effective use of the main theoretical and computational tools for the simulation of biomacromolecular systems. The underlying mathematical, physico-chemical and information technology concepts are introduced at a level of depth that allows a well-founded evaluation of scope and limitations of the different modeling approaches. The Unix operating system is introduced, and it is used in hands-on computer activities.

Propaedeuticities:

General and Inorganic chemistry and laboratory

Is a propaedeuticity for:

None

Types of examinations and other tests:

Oral examination

Course: Physico-chemical methods for the study of biological systems	**Teaching Language:** Italian
SSD (Subject Areas): CHIM/02	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice

Teaching Methods:

In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:

Physical Chemistry aims to describe, both at a macroscopic and at atomic-molecular level, structure, properties, and transformations of matter. Relying increasingly on the development of experimental methodologies and calculation, it aims at the construction of models for the interpretation and prediction of experimental parameters and at the solution of problems relating to complex systems of chemical, physical and biological interest

Objectives:
The aim of the teaching program is to offer the student the knowledge necessary to apply modern spectroscopic methods (IR, UV/VIS, Raman, Resonance Raman, Circular Dichroism, Fluorescence) to the study of the structure, dynamics, and molecular interactions of biological systems. Some of the main structural investigation techniques (X-ray crystallography, NMR spectroscopy and cryo-electron microscopy) will be addressed and explored in depth through comparisons and analyses of advantages and disadvantages in the use of one or the other. Examples from the most recent literature works will also be presented. The theoretical insights will be accompanied by practical examples regarding specific applications, some of which will be illustrated with laboratory experiences.

Propaedeuticities:
None

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

Course: Mycology and Lichenology	**Teaching Language:** Italian
SSD (Subject Areas): BIO/01	**CREDITS:** 6
Course year: third	**Type of Educational Activity: D –** at student's choice

Teaching Methods:
In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:
The sector BIO/0 studies Plant Biology at all levels of organization, including photosynthetic prokaryotes, algae, and fungi, and their symbioses. Botany studies these organisms in detail, both theoretically and experimentally, and the characteristics of their structural and functional roles in order to establish and interpret their relationships in an evolutionary context. Therefore, Botany explores, both theoretically and experimentally, the structural and functional organization of plants and their development, in order to establish their relationships and interpret, in an evolutionary context, their structures and functions, along with their reproductive mechanisms. Botany examines the various ways in which cells and organs acquire the ability to perform specialized functions and the processes that lead to the formation of complex organisms and the optimization of the reproductive process; it highlights the relationships between cytological, ultrastructural, histological, anatomical, morphological, organographic, physiological properties and the role of secondary metabolites, putting them in context with the characteristics of the development environment, as well as the molecular basis of the development of plants and fungi, with particular attention to embryology and morphogenesis. Botany also delas with the development and application of laboratory methods to the scientific studies and related biotechnological applications.

Objectives:
Knowledge and understanding of fungi and lichens, and the capacity to learn about and communicate all topics related to fungi and lichens.

Propaedeuticities:
General and Inorganic chemistry and laboratory

Is a propaedeuticity for:
None

Types of examinations and other tests:
Oral examination

ANNEX 2.2

DEGREE PROGRAM DIDACTIC REGULATIONS

BIOLOGIA

CLASS L-13

School: Polytechnic and Basic Sciences

Department: Biology

Didactic Regulations in force since the academic year 2025/26

<table>
<tr><td colspan="2">Training Activity:
under Art. 10, c. 5, letter d</td><td colspan="2">Training Activity Language:
Italian</td></tr>
<tr><td colspan="3">Content of the activities consistent with the training objectives of the course:
Other knowledge useful for job placement; IT and telematics skills; training and orientation periods) that contribute to the achievement of the CdS objectives</td><td>CFU:
6</td></tr>
<tr><td colspan="3">Course year:
third</td><td>Type of Training Activity: F - Further training activities</td></tr>
<tr><td colspan="4">Teaching Methods:
in-person/by distance</td></tr>
<tr><td colspan="4">Objectives:
Knowledge of the relationship between skills deriving from university education and professional activities, and acquisition of a first approach to the world of work in the sector of Biology.</td></tr>
<tr><td colspan="4">Propaedeuticities:
None
Is a propaedeuticity for:
None</td></tr>
<tr><td colspan="4">Types of examinations and other tests:
aptitude</td></tr>
</table>